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2 OCTOBER 1986

Worldwide Report

**NUCLEAR DEVELOPMENT
AND
PROLIFERATION**

FBIS

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2 OCTOBER 1986

WORLDWIDE REPORT
NUCLEAR DEVELOPMENT AND PROLIFERATION

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HONG KONG

CAPABILITY OF DAYA BAY TO HANDLE 'WORST CASE SCENARIO' DISCUSSED

HK310354 Hong Kong SUNDAY STANDARD in English 31 Aug 86 p 7

["Edited version of Part V, titled 'Observations'" from report by Legislative Council nuclear Fact-Finding Missions to the United States, Europe, and Japan]

[Text] General Observations

According to the information provided by experts from France, the United States, Japan, and the International Atomic Energy Agency (IAEA) during the fact-finding trips, the following observations were made:

1. The PWR (Pressurised-Water Reactor) type reactor, as is proposed for Daya Bay, is designed and will be constructed in such a way that even in the event of a worst accident resulting in a core melt-down, the containment building will be able to contain most of the radioactive products.
2. The emergency planning required to be done to prepare for a worst accident will be: a) possible evacuation within a radius of 10 km, adopted in France and Japan, or 10 miles as is required in the United States; b) contingency action on food and water to be taken within a radius of 50 km (50 miles in the United States) from the nuclear plant.
3. It is highly unlikely that an accident like the one that took place at the Chernobyl RBMK nuclear power plant would happen to a PWR.
4. An additional safety feature has been developed and adopted by France and other countries for modification of existing plants to reduce the build-up of pressure to a safe level, where necessary, inside the containment building in case of a severe accident.

This is done by means of a controlled sand filter system, the usefulness of which is recognised by the IAEA.
5. All improvements developed for control room design as a result of the Three Mile Island accident have been incorporated in the design for the Daya Bay plant.
6. The question of metal fatigue affecting the material used for the reactor pressure vessel has been resolved.

7. The cost of nuclear power varies from country to country and while in other countries the average cost of nuclear generated power is cheaper than coal-fired generated power, in the United States nuclear-generated power is more expensive than coal-fired generated power.

8. The safety of a nuclear power plant depends to a great extent on safe operation by a well-trained operation crew. In France, the United States and Japan operators are licensed by the regulatory authority of the country.

The operation crew undergo frequent periodical retraining to refresh them on emergency procedures and heighten their emergency response capability.

9. In the United States, near-site and off site emergency response services centres are set up by the nuclear power companies to give technical support to the operation crew in case of an emergency.

A clear line of communication is set up and there is a clear chain of command to ensure that an emergency is handled properly.

10. All nuclear power plants visited by the delegations are security tight. Access and exit of all persons must be authorised and are computer controlled and recorded. Site boundaries are monitored by closed circuit cameras and stringent precautions are taken against sabotage.

11. The relationship between utility companies, the government and the public in the countries visited are very open. General information about nuclear energy and the design and operation of nuclear power plants is made easily available. The public participates in public hearings, visits the plants and gets involved in emergency planning.

Observation for the Consideration of the Chinese Government and the Guangdong Nuclear Power Joint Venture Company

It has to be stated that it is recognised that the decision to build or not to build a nuclear power plant at Daya Bay lies within the jurisdiction of the Chinese government and we fully recognise the deep concern of the Hong Kong people over the safety, management and operation aspects of the plant.

If a nuclear power plant is to be built at Daya Bay, the following observations are for the consideration of the Chinese government and the Guangdong Nuclear Power Joint Venture Company (GNPJVC).

Design and Construction

1. To incorporate the sand filter system into the containment building design so as to further increase the safety features of the containment building at the highest level under condition of high-pressure build-up.

2. To incorporate a hydrogen recombiner system so as to reduce the probably danger of high level hydrogen concentration, thereby avoiding the possibility of hydrogen combustion.

3. To incorporate pressurised containment penetration design onto the penetration sleeves of those pipes that have to penetrate through the containment building. The incorporation of this feature would help to prevent any leak of air from inside the containment to other areas.
4. To establish an emergency response facilities centre within the site boundary but isolated from the plant, where technical support and command control can be given during emergency.
5. To ensure that the nuclear island (reactor building) is so constructed as to avoid contamination of underground water in case of a severe accident.
6. To ensure, during the construction stage, stringent quality control, and to make use of the IAEA Pre-Operational Safety Review Team's (Pre OSART) visit to to Daya Bay.

Accidents and Emergency Planning

1. To set up a national incident response headquarters to give support to the nuclear plants at Daya Bay and elsewhere in the event of incidents, and to consider direct access to the computer data links to be offered by Electricité de France.
2. To establish an effective and independent communication system, including direct telephone lines and back-up facilities for communication during emergencies between the Daya Bay Plant, the Chinese nuclear safety authorities and the Hong Kong Government.
3. To use a single, consolidated instruction manual for plant operation, specifying clearly the chain of command and operational steps in the event of an accident or an emergency warranting a shutdown.
4. To join the IAEA convention on early notification of a nuclear accident and the convention on assistance in the case of a nuclear accident or radiological emergency.
5. To draw up comprehensive and well-coordinated emergency plans for the safety of the people living in the close vicinity (10 km by French standard, 10 miles by U.S. standard, and 8-10 km by Japanese standard) of the Daya Bay plant
6. To enter cross boundary agreements with Hong Kong on the exchange of information and coordination of contingency planning.

Central Management

1. To take up a further technical assistance contract with Electricité de France after commissioning and during the life span of the Daya Bay Plant.
2. To delineate clearly the sphere of responsibilities between the government ministries and agencies for management and regulatory control of nuclear plants so as to ensure that there are checks and balances.

3. To establish an independent advisory body for nuclear safety and nuclear regulatory control with Hong Kong participation and to draw on the knowledge and experience of experts from the IAEA, France, the United States and Japan.
4. To set up an independent inspectorate to inspect the nuclear plants to ensure that safety standards are maintained and safety regulations are enforced.

Plant Management and Training

1. To provide for Hong Kong Nuclear Investment Company's (HKNIC) participation in the management of the Daya Bay Plant for the life span of the plant? [question mark as published]
2. To develop a system of regular inspection and maintenance for the Daya Bay nuclear power plant to secure operational quality assurance.
3. To institute regular training and retraining to heighten the operating crew's awareness of safety and preparedness for responding to emergencies (in the case of the United States, operators are required to attend a week of simulator room retraining for every 4 to 6 weeks of normal work).
4. To make use of the IAEA Operational Safety Review Team's (OSART) visits to Daya Bay after commissioning.
5. To work out and maintain tight security at Daya Bay for the protection of the plant and facilities from sabotage.

Environmental Safety

1. To set up a comprehensive and effective system of monitoring stations for monitoring radiation.
2. To study the possibilities of atmospheric dispersion of radionuclides affecting the food chain and sources of water supply to the surrounding areas including Hong Kong and draw up remedial measures if contamination occurs.
3. To draw on the knowledge and experience for disposal of nuclear waste from such countries as France, the United States and Japan which have done advanced research into this problem.

International Arrangements

1. To make the most of all IAEA assistance in training, inspection mission and regulatory advice and adopting, to start with, the IAEA safety requirements criteria as set out in the Nuclear Safety Standards (NUSS).

Public Education and Information

1. To urge the GNP JVC to play an active role, as in the case of utility companies in France, the United States and Japan, in educating the public about nuclear energy in general and the Daya Bay Plant in particular.

2. To require Framatome to explain to the public the design of the Daya Bay Plant and how the safety features could counter the maximum credible accidents.
3. To make available as much information as possible to the Hong Kong public about the construction, quality, precautions taken of the plant and to set up a public enquiry bureau to facilitate better understanding.
4. To make public the safety analysis reports prepared by the Electricite de France when it is completed.

Economic Aspects

The economic efficiency of nuclear power is multi-factoral and varies from country to country, and we cannot make an assessment on whether there are economic benefits to China in building the Daya Bay nuclear power plant or not.

Nevertheless, we wish to be ensured that the future electricity tariff being charged to the people of Hong Kong will not be higher than the tariff charged by the Hong Kong power companies for the life span of the Daya Bay nuclear power plant.

Observations for the Consideration of the Hong Kong Government and the Hong Kong Nuclear Investment Company

The following observations are for the consideration of the Hong Kong Government and the Hong Kong Nuclear Investment Company (HKNIC):

Contingency Planning

1. A contingency plan should be drawn up for those areas which lie within 50 km (50 miles by U.S. standard) from the Daya Bay Plant for protective measures in the event of radiological releases affecting Hong Kong.
2. Protective measures should be planned against the contamination of water supply, vegetables and other food and dairy products.
3. A government committee should be set up for the preparation of contingency plans.

Cross Boundary Agreement

1. Cross-boundary agreement should be made with China to enable Hong Kong to monitor radioactivity at close range of the Daya Bay Plant, to exchange information and to coordinate contingency planning for Hong Kong.

Public Information

1. The Hong Kong Government should strengthen her public information programme to make available information about nuclear energy and the effects of radiation.

2. The HKNIC and China Light and Power should introduce a public information programme and disseminate to the public information with regard to nuclear power. An information bureau should be set up to answer questions from the public.

Advisory Committee

1. The Hong Kong Government should set up an independent advisory committee to advise on matters related to nuclear energy.

IAEA Membership

1. To establish international links with nuclear safety agencies and to obtain information and advice on nuclear safety, the Hong Kong Government should consider Hong Kong's membership in the IAEA.

Atomic Industry Forum Membership

1. HKNIC should consider joining the Atomic Industry Forum, which is a U.S. nationwide as well as an international organisation, to obtain formation exchange on, and technical support for, the nuclear industry.

/12232

CSO: 5100/10

HONG KONG

HONG KONG TO GET NUCLEAR ACCIDENT PLAN BEFORE DAYA BAY OPENS

EK300416 Hong Kong SOUTH CHINA MORNING POST in English 30 Aug 86 p 1

[Report by Albert Chaw]

[Excerpts] Hong Kong will have a nuclear accident survival plan in place by 1991—about a year before Daya Bay nuclear plant is due to be commissioned.

The government will then begin conducting regular exercises and drills to test the efficiency of the disaster plan and to ensure that Hong Kong is ready to cope with any nuclear mishap by the time the power station opens.

The timetable for the introduction of emergency procedures was disclosed by Principal Assistant Secretary of the Economic Services Branch Mr John Wilson, who is the "Daya Bay man" within the government.

His branch is the overall liaison and policy centre within the government which is handling the controversial issue.

Mr Wilson was in the branch working closely with the former economic services secretary, Mr Piers Jacobs, back in 1983 and 1984 when the government and the Executive Council gave the go-ahead for the project.

He recently returned to the section as the nuclear safety issue intensified after the Chernobyl accident.

During a recent trip to Britain, Mr Wilson and two other government officials met experts of the United Kingdom Atomic Nuclear Authority (UKAEA) to discuss the contingency planning report now being compiled by the authority.

The report, to be ready before the end of this year, will contain only proposals for emergency planning, Mr Wilson said.

Actual safety and emergency arrangements will be mapped out by the government based on the report's recommendations.

One of the these recommendations will be for the Hong Kong Government to set up an emergency task force within the administration to cope with any mishap.

UDAEA experts also advised the government to have regular drills for officials in this task force so that they could be activated immediately after an accident occurred.

This suggestion was put to a Hong Kong Government delegation during their recent visit to Britain to meet USAEA experts based in Harwell.

The Hong Kong delegation comprised Mr Wilson, Mr Graham Osborne, director of Electrical and Mechanical Services Department, and Dr M.C. Wong, who is in charge of radiation monitoring at the Royal Observatory.

UKAEA officials agreed to a request from delegates to write the report in Layman's terms, so that the public could understand.

The Hong Kong delegation also spoke to another group of UKAEA experts at Culcheth who are compiling the phase two report of accident assessment on the Daya Bay nuclear station.

The earlier phase one report, which was confidential but leaked to the media, caused considerable controversy, especially the part dealing with the probability of a serious accident.

It highlighted the unlikelihood of an accident--and was released before the Chernobyl disaster.

Mr Wilson said yesterday the issue of accident probability was brought up in the discussion with the experts, who told the Hong Kong officials they stood by their study.

But the second phase report, at the request of the Hong Kong Government, will include consideration of Chernobyl.

/12232

CSO: 5100/10

HONG KONG

CONTRACTS ON DAYA BAY TO BE SIGNED IN SEPTEMBER

HK300645 Hong Kong HONG KONG STANDARD in English 30 Aug 86 p 1

[Report by David Wong and Li Wing-on]

[Text] Signing of the major contracts for the Daya Bay nuclear power plant will take place on 24 or 25 September, reliable sources told THE STANDARD yesterday.

The venue of the signing ceremony will be Shenzhen where the plant's headquarters are located, not Beijing as reported earlier.

The decision on the contract-signing date was made by top Chinese officials working on the project under the leadership of Vice Premier Mr Li Peng.

It is understood the Hong Kong Government was also informed of the decision a few days ago.

Sources said all preparations for the mammoth project have been completed, and the infrastructure is ready for the works to start once the green light is given after the signing of the formal contracts with both French and British suppliers.

A source told THE STANDARD that Shenzhen was chosen as the venue for signing the contract because most of the negotiations for the project took place there, though the signing of the letters of intent was held in Beijing.

However, it is not yet known who will take part in signing the formal contracts.

The indications are that the chairman of the Guangdong Nuclear Power Joint Venture Company, Mr Wang Quanguo, will probably represent the Chinese side to sign the multi-billion dollars project.

According to the classified company document seen by THE STANDARD, it is planned to take 78 months to construct the plant after formal contracts are signed on the supply of the nuclear facilities.

Site formation and other infrastructure facilities including a road network and reservoirs have been completed.

"The official stand on the construction is to strive to finish the construction in 6 years, but it must not be more than 7 years," the document read.

Meanwhile, the full report of the Legco [Legislative Council] fact-finding missions to nuclear plants in the United States, Europe, and Japan will be made public today.

Councillors will be receiving a copy each in the morning while copies will be made available to the press in the afternoon together with a statement issued by members who have joined the tours.

The scheduled publication of the report will pave the way for next Wednesday's extraordinary in-house meeting of the Legco members who will probably have a heated debate on whether the council should call for a special open session to discuss the issue.

The legislature is at present in summer recess.

There has been angry exchanges between two camps. Those with reservations about Daya Bay have identified themselves with firm opponents of the project, Mr Martin Lee and Dr Conrad Lam.

Their target has been to press for the quick release of the reports of the Legco nuclear fact-finding missions abroad.

And in doing so, the two, especially Mr Martin Lee have had heated exchanges with mission leaders Allen Lee and Maria Tam.

/12232

CSO: 5100/10

CANADA

CANADIAN SYSTEM TO CURB RUNAWAY REACTOR OUTLINED TO SOVIETS

Ottawa THE WEEKEND CITIZEN in English 30 Aug 86 p A6

[Text]

VIENNA — Steps to prevent another Chernobyl-scale nuclear disaster may include a fast shutdown system modelled on the one developed after a reactor accident at Chalk River in 1952.

This "very fast and powerful system" and Ontario's nuclear-emergency response plan were outlined at a private meeting of Canadian and Soviet representatives Friday.

Rudolf Rometsch, the president of the Swiss Nuclear-Waste Association, said the Soviet reactor at Chernobyl went from seven per cent of its capacity to "a hundred-times its nominal value in less than a second and the power plant was destroyed in the following four seconds." He chaired the review in Vienna this week of the April 26 accident at the Chernobyl reactor in the Soviet Union.

The Canadian system to curb such a runaway reactor responds in less than two seconds and is tested once every shift at nuclear power stations in Ontario, Quebec and New Brunswick, the Canadian delegates said.

"I mentioned our system to the Soviets because the NRX accident (at Chalk River), while on a much smaller scale, had some similarities to Chernobyl,"

said Gordon Brooks, the vice-president and chief engineer of Atomic Energy of Canada Ltd.

Canadian experts said they want the fallout from the Chernobyl reactor disaster to include exchanges of nuclear science and safety procedures with the Soviet Union.

"We're trying to establish working-level contacts with them," said Ron Thomas, a science counsellor at the Canadian embassy in Vienna, after the lunch meeting with Soviet nuclear experts.

Brooks said exchanges might be useful in two areas: operating procedures and the chemistry of zirconium alloy pressure tubes, which are common to both the Chernobyl-type Soviet RMBK and Canadian Candu reactors.

Soviet scientists at the Vienna conference told Farroukh Ali, Ontario's nuclear-emergency planner, they wouldn't begin to consider evacuation during a nuclear accident until radiation is likely to be above 25 rems (units of radiation exposure) and it is not mandatory unless a level of 75 rems is reached.

In Ontario, people within 10 kilometres of a nuclear station would be evacuated if radiation of between one and 10 rems was predicted.

/9274

CSO: 5120/49

CANADA

BRIEFS

URANIUM EXPORTS--Canada still ranks as the world's leading producer and exporter of uranium, according to the annual assessment of the country's uranium supply released Wednesday by the Energy Department. At the end of 1985, total recoverable resources in the measured, indicated and inferred categories were estimated at 545,000 tonnes of uranium, down slightly from 551,000 tonnes reported for 1985. The most significant change from 1984 is a 19-per-cent increase in measured resources, largely the result of continued uranium exploration and development in northern Saskatchewan. Canada's five uranium producers, operating seven production centres, supported a workforce of 5,200 and produced concentrates in 1985 containing 10,880 tonnes. About 85 per cent of this country's annual production is destined for export. Canadian producers shipped an estimated 10,029 tonnes in 1985. [Text] [Ottawa THE CITIZEN in English 4 Sep 86 p C13] /9274

CSO: 5120/49

2 October 1986

ARGENTINA

REPORT ON SAFETY CONDITIONS AT NUCLEAR PLANT

Safety Conditions Termed 'Precarious'

PY061650 Sao Paulo FOLHA DE SAO PAULO in Portuguese 4 Sep 86 p 10

[By Flavio Tavares from Buenos Aires]

[Text] A secret report prepared by a control team of the National Atomic Energy Commission [CNEA], which came to light yesterday in Buenos Aires, reveals that current safety conditions are precarious at Atucha I, Argentina's oldest nuclear plant.

Located 100 kilometers to the northeast of Buenos Aires and built using the German technology of the Kraft Werk Union Company (technology similar to that of the Angra I nuclear plant), Atucha I has been operating since 1974k but recently has slipped dangerously into disrepair. In less than 2 years the nuclear plant has experienced three serious accidents that have been kept quiet by the Argentine Government: The first accident occurred on 12 November 1984 when the failure of the cooling pumps' electronic temperature sensor caused the plant to shut down; the second, on 4 July 1985 was caused by a malfunction in a valve; and the third, on 17 September 1985, when pressure in "the primary system" dropped dangerously because the malfunction of an electronic control caused a valve to open.

The report, prepared by the Advisory Council for Nuclear Central Licensing and signed by physicist Adolfo Touzet, briefly refers to those "operational incidents" and, throughout its 15 pages, it carefully details scores of other failures in the security system.

The report reads: "The most serious problem stems from the difficulty in obtaining replacement parts, thus impeding preventive maintenance. This situation, compounded by the suspension of programmed shutdowns for inspection, maintenance, and of worn out elements, has caused a progressive deterioration of the installation."

The report also criticizes the shortage of specialized personnel, pointing out that "in recent years, many of the most qualified and experienced personnel have gone to other duties and no adequate replacements have been provided."

Courses to train nuclear plant personnel "were discontinued 5 years ago and an effort to resume them was suspended." In addition, the report enumerates other fundamental flaws:

- 1) The engineering group has personnel exclusively for routine work, and it cannot find solutions to the existing situation.
- 2) The two quality control technicians have been transferred to other duties without being replaced.
- 3) The currently small technical staff cannot cope with emergency situations in case of operational incidents.
- 4) Under these conditions it is difficult to review and update operations or even to analyze the results of the "test plan" or to check on the performance of the components "in order to establish the reliability of operations."
- 5) The electronic modules and components of the plant's control system belong to an obsolete generation that has been superseded, thus "calling for special maintenance."

The report says that serious trouble was detected in June 1985 when fuel elements were found to have been damaged. A high reading on the monitors sounded an alert, and one of the "damaged fuel elements" was identified "only by the difficult job of sliding it back into its respective channel."

After enumerating the failures at a plant in Belgium in 1983, the report says that a similar accident occurred in Atucha I, "where there have been problems in assembling the seals on the main pumps." This seems to refer to the cooling system of the Argentine plant.

The CNEA yesterday confirmed the authenticity of the report, which was published by the newspaper *AMBITO FINANCIERO*. Before noting that "the level of safety requirements at the plant is one of the highest in the world," an official CNEA communique stressed that "the report is valuable only as a basis for studies by the "Advisory Council," which will issue the final conclusions."

The Advisory Council for Nuclear Central Licensing has been inactive at least since last March. Since then it has not said a word about the safety problems and risks in Argentina's oldest nuclear plant, which has a generating capacity of 320 mw and supplies electricity to part of Buenos Aires.

The report stresses that the plant's current operation "does not comply with established norms."

CNEA President Alberto Constantini said, however, that there is no reason for alarm: "The safety conditions continue to be good and the plant is operating normally."

CNEA Chief Denies Safety Risk

PY061224 Buenos Aires BUENOS AIRES HERALD in English 5 Sep 86 p 11

[Text] (NA)--The head of the National Atomic Energy Commission (CNEA) Alberto Constantini yesterday denied there was any danger regarding security conditions in the Atucha I nuclear power plant, adding that work under way there would not be paralyzed.

He was replying to a report issued by the Advisory Council for the Licensing of Nuclear Installations (CALIN), one of the departments of his commission, which said security conditions at the Atucha I plant were not up to normal requirements.

Constantini said the report was issued by mistake and insisted that "we can give assurances that the Atucha I plant is operating under total security and we are determined to fully meet all security norms even though, as has been characteristic in Argentina, they be excessive as regards reality."

He added that it was necessary to clarify this because of the psychosis sparked by the accident at the Chernobyl plant in the Soviet Union.

"We have spent in Argentina \$2,000 per kilowatt against \$200 spent by Russia, because we want to have greater security and--that security--we're going to preserve it," he said.

New Plant Possible in Chaco

PY070345 Buenos Aires TIEMPO ARGENTINO in Spanish 3 Sep 86 p 16

[By TIEMPO ARGENTINO correspondent in Resistencia Reynaldo Martinez]

[Excerpt] Alberto Constantini, chairman of the Argentine National Atomic Energy Commission [CNEA] has said it is possible that a nuclear power plant will be built in the Argentine northeast, specifically in Chaco Province, because "the type and cost of the fourth and fifth Argentine nuclear plants are currently under study." He stated that once this stage is over, feasibility and site studies will be conducted.

Constantini went on to say that "Chaco Province is appropriate because nuclear plants require areas free of seismic activity that have an abundance of water available, conditions that are fully met by that province." He added that CNEA's policy is to "gradually decentralize from the Federal Capital not only the nuclear power plants but also other activities and to distribute them among the provinces."

Constantini was participating in the First Congress on Nuclear Energy to be held in Resistencia, and he has signed an agreement with Chaco Governor Florencio Tenev "to promote the use, development and application of radioisotope techniques in the fields of medicine, biology, drug production, agriculture, livestock, renewable and nonrenewable resources, industry and physical and chemical nutrition."

/8918

CSO: 5100/2127

ARGENTINA

BRIEFS

COMMUNIQUE ON NUCLEAR PLANT SAFETY--Buenos Aires, 28 Aug (TELAM)--The National Nuclear Energy Commission (ENEA) tonight gave assurances that Argentine nuclear plants are functioning absolutely normally and in compliance with strict safety conditions. In a communique released by Government House, the CNEA stated that the public does not have to worry about the operation of nuclear plants or about safety conditions. The CNEA also dismissed press reports that have cast doubts over the operation of the plants. The CNEA deplored that the information, aired by radio stations, has raised doubts among the public. The commission said that the information was based on an internal report which was issued by an advisory organ. The report contained neither resolutions nor conclusions, merely observations of a purely technical nature that must be evaluated by specialists. The CNEA explained that the internal report was produced by the Advisory Council for Licensing Nuclear Facilities (CALIN) and that, as such, its only purpose is to serve as a document for analysis by CALIN members. The communique said that the report will be considered valid only if CALIN issues a recommendation. The CNEA communique was released after CNEA head Alberto Constantini met with President Raul Alfonsin. [Text] [Buenos Aires TELAM in Spanish 0113 GMT 29 Aug 86 PY] /8918

CSO: 5100/2127

BRAZIL

INDIAN HELP ON FAST-BREEDER TECHNOLOGY SOUGHT

PY062220 Sao Paulo FOLHA DE SAO PAULO in Portuguese 27 Aug 86 p 4

[Text] Brazil has requested Indian cooperation to develop the technology to build fast-breeder reactors, which are extremely sophisticated and continue working after having consumed their initial fuel. They are internationally known as "fast breeders" [in English].

The initial contacts with India were made last January, when the chief of the Nuclear Energy Division of the Advanced Studies Institute [IEAV] Raghavan Pillai Kesavan Nair, visited the Indira Gandhi Research Center in Kalpakaam, southern India during his vacation.

The IEAV belongs to the Aerospace Technology Center [CTA] of the Aeronautics Ministry, and is located in Sao Jose dos Campos (97 km northwest Sao Paulo).

The Indira Gandhi Research Center is responsible for developing technologies of sodium refrigerated fast breeders. By the end of last year, the Indian scientists had achieved criticality with their experimental fast breeder for the first time. This means that they put in operation a prototype of a reactor which was not meant to produce energy but rather to train experts in its construction and operation.

On that occasion, Kesavan talked with Indira Gandhi Research Center managers about establishing two lines of cooperation between Indian and Brazil's IEAV: one in the field of test breeder construction technology, and the other in the field of nuclear data, that is, computer storage of the data necessary for a fast breeder reactor project.

The Nuclear Engineering Institute [IEN] of the National Commission for Nuclear Energy [CNEN], located on the Rio de Janeiro Federal University [UFRJ] campus on Fundao Island (north of Rio), is also working on construction technology for a fast breeder. One of the research projects that is being carried out is on the so-called "sodium circuit," in other words, the reactor is cooled with sodium. During the first half of the year, a CTA team visited the IEN to become acquainted with these research projects.

/12232

CSO: 5100/2130

BRAZIL

OFFICIAL ADMITS RESEARCH IN NUCLEAR FUEL CYCLE

Submarine Fuel Needs

PY110219 Rio de Janeiro Rede Globo Television in Portuguese 0025 GMT 11 Sep 86

[Interview with Rex Nazare, Chairman of the National Nuclear Energy Commission on the Globo Reporter Program, "Brazilian Materiel Industry"; date and place not given -- recorded]

[Text] [Reporter] In order for Brazil to build nuclear submarines, it must know how to make the fuel: enriched uranium. Brazil must master the nuclear cycle. The only person who can tell us the truth about the research being done in this sector is Rex Nazare, president of the Brazilian Nuclear Energy Commission. Will Brazil some day be in a position to have fuel for a nuclear submarine?

[Nazare] Brazil is carrying out research in these areas in order to fully master the fuel cycle, including the enrichment of uranium. Once we master this cycle, we will be able to supply this material for nuclear propulsion and after a given amount of time, we will be able to provide fuel for nuclear submarines.

[Reporter] Does this mean that Brazil is developing an entirely Brazilian project for mastering nuclear technology?

[Nazare] Yes, based on the characteristics of its minerals, and on the deposits existing in the country, Brazil has decided to develop the complete cycle of nuclear fuel for peaceful purposes.

[Reporter] What is the current level of development of this research?

[Nazare] Look, like any industrial development, this is a matter that requires national secrecy.

FY110115 Madrid EFE in Spanish 2339 GMT 10 Sep 86

[Text] Brasilia, 10 Sep (EFE) — The Brazilian Government announced today for the first time that it has been developing an uranium-enrichment program for nuclear use with Argentina.

The announcement will be made by Rex Nazare, President of the National Nuclear Energy Commission, during a program to be broadcast tonight by the GLOBO television network.

The GLOBO network has reported that Nazare will say that "the program is being carried out in cooperation with Argentina."

/9738

CSO: 5100/2126

BRAZIL

NUCLEAR SUBMARINE CONSTRUCTION TO TAKE 10 YEARS

PY070040 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 5 Sep 86 p 5

[Excerpts] The project for the construction of a Brazilian nuclear submarine is technically viable: The construction of a centrifuge prototype for the enrichment of uranium to propel a submarine has been completed. This information was passed on to O ESTADO reporter Helio Contreiras by a high-level government source. In his Rio de Janeiro office, Navy Minister Admiral Henrique Saboia declined to elaborate on this information, stating that it is a secret research project. He said: "We have no reason not to proceed with a project that will give us a nuclear submarine in the future." He emphasized that the project is for the construction of a nuclear submarine, not an atomic bomb.

According to the government source, the project is further along than the press has reported. The construction of the first centrifuge prototype has already secured for Brazil the possibility of developing the technology necessary for a nuclear submarine. Of course, Brazil must also gain the capacity to build that type of warship.

The Navy Engineering Directorate has already prepared a plan for a Brazilian nuclear submarine. To build a nuclear submarine, the Navy cannot depend on a foreign plan, as it is doing with three conventional units that will be built in the Navy Arsenal of Rio de Janeiro. These will follow a German plan known as the IKL-209-1400 Class. The Navy is also conducting research with the cooperation of the Nuclear Research Institute (IPEN) and the University of Sao Paulo.

According to an officer who has followed the process from the beginning, one of the problems of the uranium-enrichment project that will produce the nuclear fuel to propel the submarine involved metallurgy, but it has been overcome. The Brazilian nuclear submarine could be operational within 10 years, depending on the financial resources available for the project. This timetable, which might very well be shortened, was based on the Navy's more recent budgets.

NUCLEP [NUCLEBRAS Heavy Equipment, Inc.], a NUCLEBRAS subsidiary, is participating in the construction of the first three conventional submarines in the Rio de Janeiro Navy Arsenal. This experience should facilitate the construction of the nuclear submarine. The Navy minister revealed that an agreement to that effect had already been signed with NUCLEP.

Under the contract signed with the Navy, NUCLEP will build the hulls of the first three conventional submarines and will later participate in the development of the nuclear unit.

BANGLADESH

BRIEFS

NUCLEAR RESEARCH REACTOR COMMISSIONED—A 3-megawatt research reactor was commissioned at the Atomic Energy Research Establishment at Savar near Dhaka today. The chairman of Bangladesh Atomic Energy Commission told newsmen that the 180-million taka reactor will help establish a scientific and technological base in nuclear science and technology in the country. The opening of the reactor was witnessed by the secretary of the Ministry of Energy and senior officials of the Atomic Energy Commission. The chairman said the safety of the reactor was thoroughly examined by a committee of experts. It will not pose any safety problem of health or health hazards to the workers and the public during normal operation. He added that this reactor is covered under the safeguard agreement with the International Atomic Energy Agency. [Text] [Dhaka Domestic Service in English 1530 GMT 14 Sep 86 BK] /9274

CSO: 5100/4756

INDIA

GANDHI EXPLAINS POSITION ON NUCLEAR WEAPONS

New Delhi PATRIOT in English 12 Aug 86 p 1

[Article by Sitansu Das]

[Excerpts]

After a sleepless night at Moscow airport, where he was forced to land shortly after midnight, Prime Minister Rajiv Gandhi said the killing of General Arun Vaidya, need not mark deterioration in the situation created by terrorists.

The Prime Minister was answering questions by the journalists aboard the aircraft the Soviet authorities had placed at his disposal for his return to Delhi after a fire alarm in No 3 engine of the four-engine Boeing 707 obliged him to make an emergency landing in Moscow airport.

On India's military nuclear option to counter Pakistan's nuclear weaponry programme, the Prime Minister said: "I have reiterated on a number of occasions that we really have no intention to build a nuclear weapon. We do not think it will be beneficial to us. We do not think we can really afford a nuclear weapon and all that goes with nuclear weapons (delivery systems etc.).

What would India do if Pakistan went ahead and acquired the nuclear weapon? Mr Rajiv Gandhi replied: "We do not have an answer at the moment. We hope that Pakistan's friends would persuade it not to get nuclear

weaponry".

Asked if his reply today on India's nuclear option was not somewhat different from the positions taken by him in the past (in that he ruled out today nuclear weapons for India, regardless of the contingencies in the neighbourhood, his past positions seemed to leave India's response somewhat flexible), the Prime Minister was firm in asserting that there was no modification. What he said today had in effect been said by him in all previous statements since he took over as Prime Minister.

Arising from his replies on the nuclear option was a question he answered about India's attitude towards the NPT. As the Prime Minister had ruled out the N-weapon for India, what attitude should India be taking towards nuclear proliferation—over which India's position, since this country had abandoned the possibility of ever acquiring atomic weapons, gave India many disadvantages without offering the prospects of any current or future benefit? The Prime Minister said proliferation was a complex problem which engaged attention. But he, as of now, had no solution to offer.

/13104
CSO: 5150/0168

INDIA

NUCLEAR POWER CHAIRMAN BRIEFS SCIENTISTS ON PLANS

Bombay THE TIMES OF INDIA in English 8 Aug 86 p 9

[Article by George Abraham]

[Text] **T**HE nuclear power board (NPB) is to be converted into an autonomous corporation within the next six months to enable the department of atomic energy (DAE) to tap extra-budgetary resources and meet the goal of 10,000 MW of nuclear power by 2000 AD.

Scientists and officials of the NPB were briefed about this at a meeting convened by Dr. M. R. Srinivasan, chairman of the NPB, a fortnight ago.

The corporation proposal is now before the DAE, of which, the NPB is a constituent unit. Dr. Srinivasan told this paper today.

The NPB is responsible for the design, commissioning and operation of nuclear power plants all over the country. It currently operates the atomic power stations at Tarapur, Rawatbhata and Kalpakkam.

The planning commission has allocated Rs. 1,410 crores to the DAE for the nuclear power sector under the seventh five-year plan. This will just about meet the cost of setting up four additional 235 MW stations, two each at Narora in U.P. and Kakrapar in Gujarat, all of which will be commissioned by 1990, a senior official of the DAE said.

The DAE has gone ahead with its plans to commence work on four more

stations, two each at Kaiga in Karnataka and Rawatbhata in Rajasthan — all of 235 MW installed capacity. These will be commissioned in 1994, sources said.

Additional powers were given to the NPB in 1984-85, when the Power Projects Engineering Division (PPED) was reconstituted to form the board. Groups were formed within the NPB for the design, engineering and implementation of the 235 MW and the proposed 500 MW units.

N-POWER PROFILE

The nuclear power profile for 1985-2000 AD will entail the construction of 12 standardised 235 MW units, and possibly 10 units of 500 MW output each. The programme represents an investment of Rs. 13,940 crores, at 1983 prices.

This goal has been hamstrung by inadequate financial allocations in the Union budget. The formation of a corporation is expected to help because it will be possible to float debentures. However, by giving the NPB the status of a corporation, government control over all nuclear installations will not be diluted, a senior official said.

"They would remain a DAE activity and accountability to Parliament would still be total," he said.

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CSO: 5150/0165

INDIA

DAMAGES TO RAJASTHAN N-POWER UNIT ONE TOLD

Madras THE HINDU in English 13 Aug 86 p 1

[Text]

Unit-I of the Rajasthan Atomic Power Station may have to be closed for good.

Nuclear engineers are now conceding that they have failed to repair the cracked end-shield of the reactor detected in 1982, and their fear is that commercial power generation may not be feasible again. At best, they say, the reactor can be got going for conducting experiments, and that too only after spending Rs. 60 crores on its rehabilitation.

PTI reports from Delhi:

Dr. M. R. Srinivasan, Chairman, Nuclear Power Board, told PTI that everything possible had been tried "but we have found it is not possible to solve the problem with existing technology."

The end-shield made of nickel-carbon steel supplied by Canada had been embrittled by radiation. The end-shields are huge plates bolted on to the sides of the cylindrical reactor vessel and the fuel channels, that make up the reactor core, terminate on the end-shields.

Water leak: RAPP-I was shut down on March 4, 1982 after engineers found water leaking from the south end-shield that had cracked. It took three years and Rs. 30 lakhs to plug the leak with a chemical using remote controlled equipment.

The reactor was restarted on February 1, 1985, but had to be shut down after three months as cracks reappeared in a different place, Dr. Srinivasan said.

As conventional methods of sealing did not seem to work, "a decision must be now taken whether or not to remove the damaged

end-shield and replace it with a new one," he said.

A new end-shield will give a fresh lease of life to RAPP-I, but it is said to be a major operation involving formidable problems. Nowhere in the world had such replacement been done.

Being highly radioactive, no human being can get anywhere near the reactor vessel and the entire operation including dewatering and unscrewing the bolts must be done by robots that the nuclear industry is yet to develop for such specialised job.

According to experts, the operation would take anywhere up to five years and cost several lakhs of rupees. The only alternative to end-shield replacement is to write off the reactor because it cannot be run with a leaking lid.

Channels plugged: Even after repair, RAPP-I will never again produce its maximum 230 MW power, because seven of its fuel channels have been permanently plugged during attempts in the last four years to prevent spreading of the cracks.

RAPP-I, the first Candu type reactor in India, was built by Canadians and commissioned in 1973. It cost Rs. 178 crores to build and Rs. 46 crores annually to operate.

In its eight-year life time till 1981, the plant suffered 255 outages and lost 571 working days while producing a total of 5882 million units of electricity valued at Rs. 196 crores.

According to Dr. Srinivasan, the problem faced by RAPP-I is not likely to repeat in other Candu reactors in India as the end-shield material is not the same.

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CSO: 5150/0169

INDIA

REPORTS ON ACCIDENT AT TALCHER HEAVY WATER PLANT STUDIED

Bombay THE TIMES OF INDIA in English 18 Aug 86 pp 1, 16

[Article by Praful Bidwai]

[Text] **F**ACED with a persistent demand from the Prime Minister's secretariat for a detailed explanation of the causes of the April 29 accident at the Talcher heavy water plant, the department of atomic energy (DAE) has embarked on a desperate effort to cover up serious lapses in the operation and maintenance of the nuclear facility in Orissa.

The accident, involving an explosion and a major fire that severely damaged vital equipment, has given a further set back to the DAE's heavy water programme, which has already proved the Achilles' heel of its ambitious plan to generate 10,000 megawatts (MW) of atomic electricity by the end of the century.

It was also the latest in a series of mishaps and disasters that have dogged the Talcher plant ever since 1972 and turned it into the country's worst industrial project failure.

The April accident makes it highly unlikely that the plant, already delayed by 11 years and burdened with a faulty process, will ever reach its design capacity of 62.7 tonnes of heavy water a year. Last year it produced less than one tonne and in 1984-85, during commissioning, a miserable 0.32 kg of heavy water—a record capacity rate of 0.51 per cent.

The immediate cause of the accident, it has been established, was the escape of highly flammable (ammonia) synthesis gas from the gasket of a high pressure pump (called mole compressor) in the final stages of the bithermal exchange process which enriches the content of deuterium—the heavy hydrogen isotope that mixes with oxygen to form heavy water.

The synthesis gas is drawn from the neighbouring FCI coal-based fertiliser plant stripped of deuterium and returned for conversion into ammonia. It enters the heavy water unit at a high pressure, between 150 and 230 atmospheres, and is further compressed by the mole pumps to about 300 atmospheres, the design pressure for the exchange process.

During the night of April 29, the compressor gasket failed, leading to a massive explosion and a fire that ranged for 90 minutes and whose intensity was such that metal components lying 10 meters away melted.

The causes of the failure of the bithermal gasket were investigated by two bodies, both appointed by the DAE—a high-level inquiry committee, including among others Mr. G. Sundaram of the Reactor Research Centre, Kalpakkam, and BARC and DAE heavy water projects officials; and a one-man committee comprising Mr. K. P. Rao, a senior HWP headquarters official appointed by Mr. N. Srinivasan, HWP chief executive and now a member of the Atomic Energy Commission through an official order (HWP/CE/18/86/3107 of June 11).

Mr. Srinivasan is now engaged on an effort to reconcile the findings of the two reports but the conflict between the contents of the two remains unresolved.

The high-level inquiry committee produced a remarkably vague and general report on the basis of which no responsibility could be fixed upon anyone. However, on Page 19 it identified the most likely cause of the accident: the absence in the gasket assembly of one of two thin aluminium

liners which are meant to provide a seal and prevent leaks of explosive gases.

The implication of the report is that, either through negligence or deliberately, one of the liners was not put into position in the gasket before its cover was tightened and the compressor was put into use on April 23. This was done six days before the accident. It followed another failure of the equipment leading to a leak. Without the liner, the committee's report argues, the assembly could not be properly sealed, the leak and explosion ensued.

This report did not satisfy the Prime Minister's office which asked for complete details so that responsibility could be fixed on specific individuals. Following this two meetings were held over the past two months by Mr. Gandhi with senior HWP officials including Mr. Srinivasan, Mr. B. N. S. Rao and Mr. K. S. Bimbhatt (executive director); the officials failed to answer the queries made.

Meanwhile Mr. Srinivasan, accepting the main findings of the high-level inquiry committee, asked Mr. K. P. Rao to investigate who or what was responsible for the failure to insert the aluminium liner and for maintenance lapses.

But Mr. Rao has found in his 25-page report that the aluminium liner was not missing at all; that it had been inserted and was in place, and that the probable causes of the gasket failure lay elsewhere — in faulty operating and maintenance practices.

POTENTIAL FACTORS

He has identified five such potential factors. Among them is the possible carry-over the process catalyst, potassium amide, into the compressor and consequent damage to the liner. Or electrical mishap could have occurred in the compressor motor. An important possible cause might be this initial under-tightening of the gasket cover bolts, or their subsequent loosening due to vibrations, or changes in pressure and temperature, which could have pushed the liner loose and ejected it from the gasket.

According to some Talcher engineers, the most plausible explanation might be that the concerned employees did not tighten the bolts nearly enough since they did not have a simple tool, the torque wrench, to enable them to decide just how hard they ought to turn the bolts. At any rate, each factor implies a lapse on the part of the Talcher's management.

But the manufacturers of the equipment themselves never specified the requisite torque and other parameters. Nor did the DAE insist on the speci-

cations before granting the plant's West German erectors, Udhe OMBH, an acceptance certificate in July 1983. This was done without even going through a full trial run to prove the viability of the plant.

This lapse on the DAE's part has been one source of the major flaws in the Talcher plant. Besides numerous problems such as the failure of critical equipment like plunger pumps (documented in detail in these pages on May 4 and 5 1984) and poor enrichment the plant remains dogged by a basic process flaw the potassium amide catalyst gets deposited everywhere and chokes the pipes and reaction trays. Thus instead of producing as designed, 7.8 kg of heavy water per hour, the plant can run for a short while at one to two kg per hour before it slows down to the poor rate of 0.1 kg. or 0.2 kg per hour — and finally comes to a complete halt due to choking and other mutually compounding failures. Its recovery rate has also already degenerated to only one-half of the design specifications.

It is not as if these problems were never acknowledged by the personnel working at Talcher. Indeed, its former works manager, Mr. Y. K. Bansal, had repeatedly written in numerous monthly reports in 1983 and 1984 that "the plant cannot be commissioned without major modifications." But he was consistently ignored and more recently, from Talcher to Bombay transferred. Of the five senior engineers who were connected with the erection of the plant and had acquired some familiarity with its problems, four have been pulled out of Talcher. Meanwhile, all its major problems persist unrectified.

The plant was to have been fully operational and producing 5,225 kg a month by September 1975. Instead 11 years or 131 months later, it has so far cumulatively produced less than a quarter of that quantity.

Its cost, originally estimated at Rs. 21.2 crores, has already leapt to Rs. 65 crores. It will consume another Rs. 2 crores during the seventh plan. In the current year, alone it will in addition get a non-plant support of Rs. 5.7 crores.

These recurrent and ever-increasing expenditure have produced no improvement in the DAE's ability to learn from its past mistakes. Last September a serious fire occurred at Talcher. In November last year, there was another gasket failure. But it remained uninvestigated and hence no corrective steps, such as might have helped prevent or contain a mishap of the April

29 variety, were taken.

Meanwhile, HWP engineers wonder whether the failure of the gasket and of the metal liner seal will necessitate a re-examination and redesigning of similar devices used in other heavy water projects as well.

At any rate, the recent accident has not only further delayed the full commissioning of the Talcher plant. It will also cost the government a substantial sum of money — originally stated at Rs. 15 lakhs, modified by the minister of state Mr. Shivraj Patil in his August 6 Lok Sabha statement to Rs. 40 lakhs, and estimated by the Talcher engineers, at close to Rs. 1 crore.

/13104

CSO: 5150/0170

INDIA

MEETINGS DISCUSS, SCORE NUCLEAR POWER USE

Hiroshima Day Meeting

Bombay THE TIMES OF INDIA in English 8 Aug 86 p 17

[Text] NEW DELHI, August 7: Mr. V. R. Krishna Iyer, former supreme court judge, yesterday called for an "autopsy" of our nuclear power policy.

He demanded that independent scientists go into this matter and that there should be no secrecy about the issue.

While speakers at a panel discussion on "nuclear proliferation and arms race", organised by the Committee for a sane nuclear policy (COSNUP) on the occasion of Hiroshima day, discussed the issue on the supposition that nuclear energy was here to stay, Mr. Krishna Iyer lashed out at the "rather unsuspected" aspect — "the menace of the peaceful atom".

Initiating the discussion, he said many had been appealing for the peaceful use of the atom, but today the atom was not peaceful at all. There had been

leaks and faults in nuclear reactors in many countries.

Hence, the time had come to look at this problem more closely. Nuclear power could not be left to the scientists as the Three Mile Island accident in the U.S. and the recent Chernobyl accident in the USSR had shown.

The special guest on the occasion, Dr. Humayun Khan, ambassador of Pakistan, asserted that nuclear technology was here to stay and that the question was really a political one of what we intended to do with these technologies, and how India and Pakistan could reassure each other on how they would not produce nuclear weapons.

He said unfortunately unilateral declarations by Pakistan on this issue had not had the desired effect and his country was prepared to participate in any type of conference that would serve the desired purpose.

Speeches at Seminar

Bombay THE TIMES OF INDIA in English 10 Aug 86 p 12

[Text] MR. Justice V. R. Krishna Iyer, retired judge of the supreme court, today said that the Atomic Energy Act of 1948 was "unconstitutional."

Addressing a three-day seminar on "Nuclear energy and the people in India," organised by the Sampurna Kranti Vidyalaya, Vedchi, Surat, Mr. Justice Iyer said the Act denied citizens the fundamental right of freedom to information. "Secrecy and democracy are ancient enemies," he remarked.

Mr. Justice Iyer was of the opinion that, using the amount of electricity

consumed as a yardstick of national development was a negation of all that Indian civilisation stood for. "The approach to development and progress must be based on the Gandhian cornerstone of the nation," he stressed.

The concept of nuclear energy being a "symbol of the 21st century" was a distorted "value anchorage," the retired judge felt.

The activities of the department of atomic energy (DAE) ought to be an "open book", which should be cross-examined by an independent set of experts. He called for the scrapping of India's nuclear energy programme, and

instead allocating more funds for the development of large, small and micro-level hydro projects.

Earlier, Prof. A. K. De, chairman of the atomic energy regulatory board (AERB), said that it was essential for the country to "preserve the nuclear option." Nuclear energy was still the cheapest and less harmful source of electricity, he stressed. Safety was paramount at all nuclear installations and these would never be compromised.

Replying to a question from one of the panelists, Prof. De said that though the AERB was over two years old, it did not yet have an independent apparatus to evaluate the country's nuclear installations. Thus, the AERB had to depend on DAE personnel for evaluation reports, he said.

Today's proceedings at the seminar was marked by a walk-out by a section of the scientists from the DAE, who took objection to the presence of Mr. Praful Bidwai, journalist and critic of the nuclear establishment. The four

scientists who walked out said the organisers had not told them that Mr. Bidwai was a participant at the seminar.

They termed the meeting "political" and one of them remarked: "We will not tell him (Mr. Bidwai) anything."

Mr. Bidwai, who was the main speaker at the afternoon session, analysed "Nuclear energy: culture and society." He said that nuclear energy was born out of the war machine, and was inextricably linked with weapon proliferation. Thus, it was "necessarily open to misuse," he averred.

The enormous expenditure on nuclear energy was unwarranted, as it would never be able to exceed four or five per cent of the nation's power output, he felt.

Mr. Narayan Desai of the Vidyalaya said the emphasis on nuclear energy had deprived other non-conventional energy sources of funds for research and development.

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CSO: 5150/0166

INDIA

BARC TO DECOMMISSION 30-YEAR-OLD RESEARCH REACTOR

Bombay THE TIMES OF INDIA in English 9 Aug 86 p 5

[Text]

BOMBAY, August 8: "The cradle of India's nuclear effort" — the one MW (thermal) research reactor, Apsara, at the BARC here, — will be decommissioned shortly, 30 years after it first attained criticality on August 4, 1956.

The decommissioning process will be routine for the BARC scientists, who earlier decommissioned the zero-power Zerlina research reactor in March-April, 1983.

The Atomic Energy Commission (AEC) gave the go-ahead for the construction of Apsara, the first reactor in Asia excluding the Soviet Union, on March 15, 1955. For the most part of its life, Apsara was run at a power level of 400 KW and was primarily used for basic research in physics and chemistry, and for production of radio-isotopes.

Apsara used highly-enriched uranium, which the U.K. provided as fuel, and light water as the neutron moderator and coolant. It belonged to the "swimming pool-type" of reactors and served as one of the prime exhibits for visitors to the BARC who could view the fuel elements and the core, unlike in other contemporary reactors.

The decommissioning will involve the dismantling of Apsara's systems. Radioactive assemblies like the core elements will be stored in shielded enclosures and the non-radioactive sub-assemblies could well be re-employed, senior sources at the BARC said.

The reactor building need not be demolished, but this would depend on the radiation-level there immediately after decommissioning, he said. The Zerlina reactor building is still intact and is used to conduct engineering experiments.

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CSO: 5150/0167

INDIA

BRIEFS

INDO-RUSSIAN PLEA--Bombay, 8 Aug--The sister cities of India and the USSR today appealed to all the cities of the world to actively support the programme of "complete and general elimination of nuclear weapons by the year 2000". The first conference of the sister cities of the two nations which concluded here today, called upon cities everywhere to "demand immediate and complete stopping of nuclear tests". Representatives of Leningrad, Minsk, Volograd, Odessa, Bombay, Delhi, Madras and Calcutta attended the conference. [Text] [Bombay THE TIMES OF INDIA in English 9 Aug 86 p 3] /9274

TRIBALS PROTEST N-PLANT--Surat, 7 Aug--Police fired four rounds in the air and lobbed teargas shells to drive away crowds of tribals at Bedkavudar village, about three km from the Kakrapar nuclear plant today, as the disturbances in the aftermath of the anti-nuclear demonstration there yesterday continued. The advasis were worked up over the police lathi-charge on tribals and others demonstrating against the setting up of the Rs 38-crore nuclear plant at Kakrapar, "Hiroshima Day" yesterday. They continued throwing stones at police parties guarding the area this morning. The police fired in the air on the road linking Vyara town with the plant area, when tribals gheraoed the police and allegedly attacked them. Groups also lay hiding in the bushes and used slings to propel stones at the police, it was stated. Yesterday's demonstration at the atomic plant was organised by the "Gurjarat Anu Urja Jagriti Samiti" and the "Sampoorna Kranti Vidyalaya". Some militant Advasis tried to loot the residential colonies of the plant staff, but police reportedly foiled the attempt. [Text] [Madras THE HINDU in English 8 Aug 86 p 9] /9274

KAIGA N-POWER UNIT--New Delhi, 13 Aug--The two units of the Kaiga Atomic Power Plant in Karnataka, estimated to cost approximately Rs.600 crores at 1984 prices, are expected to be commissioned in 1994, the Lok Sabha was informed today. About Rs. 19 crores has been spent on site investigations and advance procurement of long delivery equipment. Adequate funds will be provided to complete the project as scheduled. Telugu Ganga project: Andhra Pradesh has proposed forest clearance for the Telugu Ganga project. But it lacked essential information and the State has been requested to furnish them. A final decision on the proposal will be possible only after receipt of this information. [Text] [Madras THE HINDU in English 14 Aug 86 p 6] /9274

BENGAL N-POWER PLEA--New Delhi, 23 Aug--A strong case for setting up a nuclear power plant in West Bengal was made in the Lok Sabha yesterday by Mr Ashutosh

Law, a Congress (I) member from the State. In a special mention, Mr Law said if the power problem of West Bengal was to be solved on a permanent basis, nuclear power would have to be developed in the State in a big way. He said generation of the required amount of power had remained a persistent problem in West Bengal over the decades. During the Seventh Plan period, the additional capacity of 932.5 MW, including a spillover of 58 MW from the Sixth Plan was expected to be installed. In spite of this, there would be a gap between the demand and supply of around 1,030 MW, according to an estimate prepared by the perspective Power Planning Committee. According to the committee, the demand for power in the State for the years 1995 and 2000 would be around 3,411 MW and 4,409 MW, respectively. Availability of power from the existing capacity is estimated to reach 2,309 MW in 1995, which would leave a shortfall of 1,102 MW in supply. One way of achieving increased capacity might be greater utilization of the existing thermal plants and to set up new thermal power projects. Opening of thermal power plants would need adequate supply of coal, whereas coal production in West Bengal has remained almost stagnant. The time factor should also be taken into account. [Text] [Madras THE HINDU in English 24 Aug 86 p 9] /9274

CSO: 5150/0171

ZIMBABWE

NAM SUMMIT POLICY STATEMENT ON PEACEFUL USES OF NUCLEAR ENERGY

LD071333 Belgrade TANJUG in English 0234 GMT 7 Sep 86

["Final Declaration: Peaceful Uses of Nuclear Energy"--TANJUG headline]

[Text] Harare, 6 September (TANJUG)--The Non-Aligned Movement stressed the exceptional importance of international cooperation among the non-aligned countries and other developing countries in the field of peaceful uses of nuclear energy. At their eighth summit in Harare the non-aligned affirmed the inalienable right of all states to apply and develop their programmes for peaceful uses of nuclear energy for economic and social development in conformity with their priorities, interests and needs.

In their final document the heads of state or government expressed concern with regard to the obstacles which the developed countries place in the way of transfer of technologies related to the peaceful uses of atomic energy by fixing conditions which are incompatible with the sovereignty of developing countries.

The non-aligned called for the observance of the principles of non-discrimination and free access to nuclear technology and reaffirmed the right of each country to develop programmes for use of nuclear energy for peaceful purposes in conformity with its own freely determined priorities and needs.

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CS0: 5100/47

ZIMBABWE

NAM SUMMIT POLICY STATEMENT ON ISRAELI ATTACK ON IRAQI REACTOR

LD071415 Belgrade TANJUG in English 0259 GMT 7 Sep 86

["Final Declaration: Israeli Aggression on Iraqi Nuclear Installations"--
TANJUG headline]

[Text] Harare, 6, September (TANJUG) — The heads of state or government of non-aligned countries — at their eighth summit meeting in Harare — condemned Israel for its armed aggression against Iraqi nuclear installations, which are subject to the safeguards of the International Atomic Energy Agency (IAEA), as a violation of the IAEA system of safeguards and the inalienable right of peoples to use atomic energy for peaceful purposes.

The non-aligned countries request the Security Council to take effective measures to ensure Israel refrains from strikes or threats to nuclear installations in Iraq or elsewhere including installations subject to the safeguards of IAEA. The non-aligned, therefore, requested IAEA to seek additional measures to effectively ensure that Israel undertakes not to strike or threaten peaceful nuclear installations in Iraq or elsewhere in contravention of the UN Charter and in violation of the IAEA safeguard system.

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FRANCE

SEISMIC RISK IMPACT ON NUCLEAR POWER PLANT CONSTRUCTION

Paris LIBERATION in French 31 Jul 86 p 15

[Article by Guy Benhamou and Vincent Tardieu: "Earthquakes: France Makes Inventory of Locations"]

[Text] A new map of seismic zones in France has just been published under the aegis of the Major Risks Commission. Even though risks of this type spare the major part of the country, they are however taken into account in the construction of nuclear power plants and dams.

It was 11 June 1909, between Aix and Salon-de-Provence. At 9:15 pm, an earthquake registering an intensity of 9 on the MSK scale, destroyed the surrounding villages in a few seconds: 40 people were dead and many were injured. (Footnote) (The "MSK intensity" scale consists of 12 degrees. It is based on the significance of the damage caused by the earthquake. An intensity of 8 corresponds to the destruction of some dwellings, an intensity of 9 to generalized damage to structures. The Richter scale, on the other hand, is of an instrumental nature and provides the calculated magnitude of an earthquake based on seismographic recordings.) "In Saint-Cannat, the church no longer exists, but is there anything left in what used to be the village?," wrote a reporter at the time. "In Rognes, the mess is even greater. There is nothing left but ruins. In Lambesc, the same spectacle: horrible."

1986. Let us imagine that an identical earthquake were to hit the region -- 22 municipalities, 100,000 inhabitants over an area of 700 square kilometers. Based on a simulation study, the toll would then be 1,000 dead, 5,000 injured and 5 billion francs (1982) in damages. A cost which represents 0.7 percent of the national budget or 600 percent of the budget of the Provence-Cote d'Azur region. A really "minor" earthquake in an area that is not highly urbanized. Hence, one can imagine the value of the new map of seismic zones in France, which has just been published under the aegis of the Major Risks Commission.

With nearly 400 pages and more than 50 maps, the publication of the new seismic zones reestablishes a hierarchy among the various regions. Overall, 35 departments are included among the average and low seismicity zones. On the front line, the Pyrenees, the Alpine massif, the Cote d'Azur, Limagne and Alsace-Lorraine. All these regions, which are relief zones or rift valleys, are covered with faults. Every time cracks appear in the earth's crust, you get a tremor.

This new seismic zoning was carried out by the Bureau of Geological and Mining Exploration [BRGM], with the help of the Atomic Energy Commission [AEC] and the EDF [French Electric Company], due to the presence of numerous nuclear power plants in the sensitive zones. They had to compile an inventory of the 5,000 earthquakes which have occurred primarily over the last five centuries, assemble them in a data file, then run them on a program allowing subsequent examination of various criteria such as locations, dates, intensities... Hence, the resulting map provides "a statistical image of the seismicity of the territory," on which it can fortunately be noted that the large majority of the country is spared this kind of risk. But surprises are always possible...

Earthquake Preparation

In the introduction, Renaud Vic de Sage, delegate to the Major Risks Commission, stressed that "people confuse anti-seismic preparation and anti-seismic construction. But, while the dead and the wounded are victims of the collapse of structures, the fact that they did not collapse is not a sufficient criterion of security. Hospitals, rescue centers and telecommunication centers must remain operational after an earthquake. The same is true for industrial installations and stockpiles of dangerous materials." One might as well also avoid a technological catastrophe. Hence, the problem of preventing the risk of earthquakes extends largely beyond the framework of the construction industry and must take into account all the infrastructures of a region, the telephone system, the road network, water mains and gas lines, electric transmission, etcetera...

Let us look specifically at the effects on the mastodons of modern urbanization, nuclear power plants and dams. There is reason to worry about their concentration when you superimpose the new seismic risk map within the Hexagon on that of the location of nuclear and hydraulic sites. About 10 power plants and about 60 dams are located precisely in these zones, mostly along the Rhone and the Rhine or their tributaries. But, however troubling it may be, this superimposition does not imply a particular increase in risk for the population. That, at least, is the firm assurance given by the EDF experts.

Each time the French Electric Company wishes to build a power plant or a dam it proceeds with a historical study of the seismic risks of the area being considered: that is the determination of the famous Maximum Likely Historic Earthquakes [SMHV], which makes it possible to figure a seismicity threshold on the MSK scale compatible with the construction of the installations. For the power plants, three sets of figures must be considered, according to the EDF text: "Safety and Choice of Nuclear Sites"; (1) "With a seismic intensity on the order of 8 MKS, it is possible to build standard installations on that site"; (2) "With an intensity of 8 to 9 MKS, it is necessary to make special structural arrangements"; (3) "Beyond 9, the construction project is abandoned."

According to Pierre Pollier (head of the "Sites" division in the Equipment Department at EDF), the "structural arrangements" in question, made for example at Cruas (Ardeche), consist of "inserting 200 to 300 plugs (concrete cubes) in the soil at 1 meter intervals to form a kind of pavement. Then

layers of steel and neoprene are poured over it, as well as a bed plate (large substructure slab). Our system has been accepted by the relevant authorities at the Ministry of Industry (SCSIN) and at AEC (IPSN)."

Construction of Dams

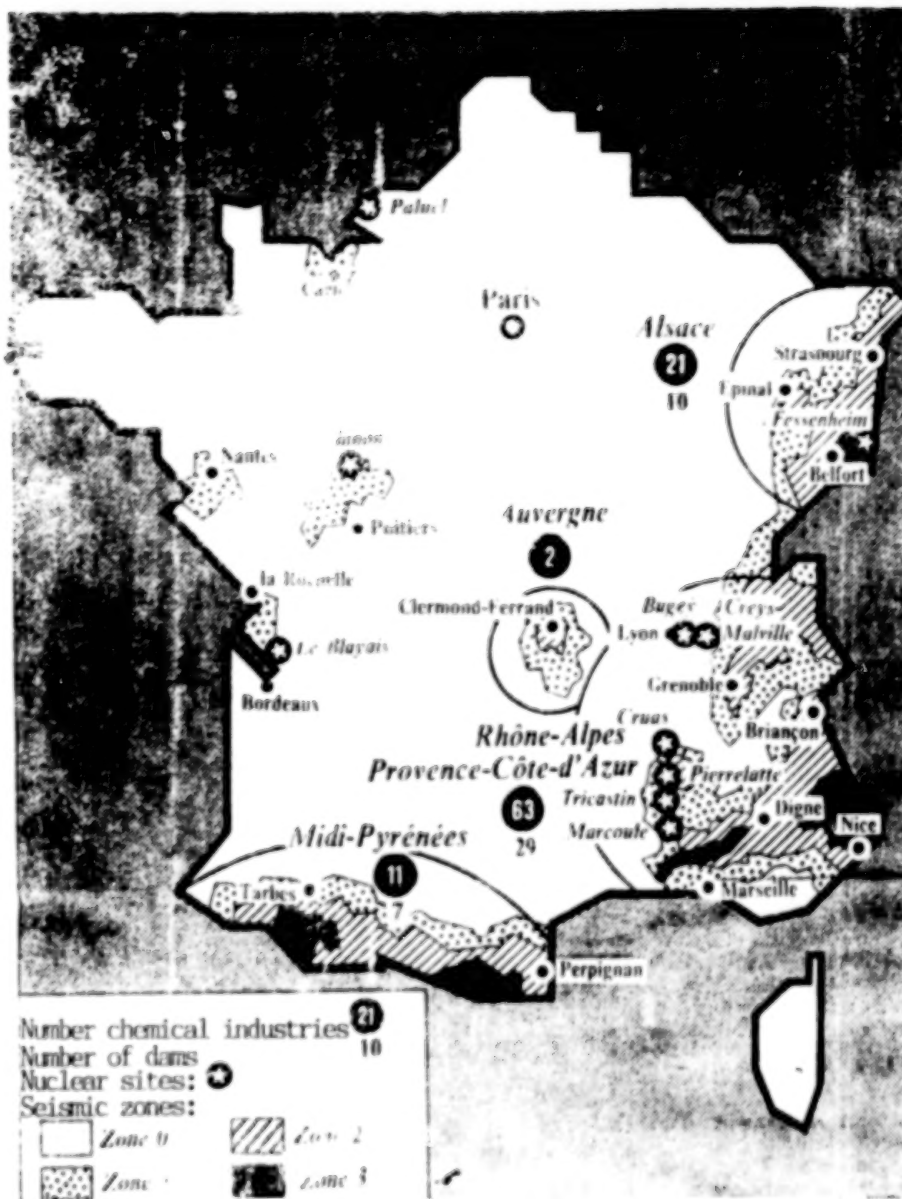
As for dams, there is maximum confidence: "There should be no fear at all with those enormous structures," stated an EDF expert on hydraulic installations. "The very shape of the dams, their mass, constitute an anti-seismic structure in and of themselves. Even with an intensity of 10 MSK, those installations do not risk much. Not a single dam project has been abandoned for reasons of seismicity and, throughout the world, none has caused deaths for the same reasons. At the time of the last earthquake in Mexico, the large Infiernello dam near the epicenter was not destroyed, only 50 meters of its railing collapsed. And yet, this was the second time it was shaken by an earthquake. In any case, all our studies and constructions are inspected by the interministerial Permanent Technical Committee for Dams [CTPB]."

The most serious problem, in fact, would come from the establishment of chemical industries in those zones. More specifically, establishments "subject to Article 5 of the Seveso directive" (European), producers of extremely corrosive products (chlorine and other gasses or flammable liquids...). About 100 of them are located in the seismic zones: 20 in Alsace and one on the territory of Belfort, 18 in the Rhone-Alpes region, 2 in Auvergne, 11 in the Pyrenees region, and 45 in the Provence-Alpes-Cote d'Azur region.

"It will probably be necessary," stressed Patrick Guilhaudin, adviser for major risks to the minister of environmental affairs, "to check the conformity of the installations with this type of risk. Which could eventually lead to an effort to contain several installations at risk." Even then it will be necessary to make sure that this type of containment will prove effective to resist the most intense earthquakes, and to know who will pay for these new installations. Would it not be better, in some cases, to move a few enterprises, or at least to limit their establishment? A more radical approach adopted by Haroun Tazieff, representative in Isere of Vice Minister for Environmental Affairs Alain Carignon: "What would be involved would be to enact real requirements, and to have them implemented. Without that the reports will not serve much purpose."

The real stakes of this new study relate to possible changes in the permits and standards of construction. For the time being, the ministry remains completely silent on the subject, but assures that it will initiate interministerial consultations right after the vacation period. Hence, the only action provided for is to circulate this report first of all to the regional decision makers, before producing a number for the public at large. In order to calm the people's worries at the sound of the first rumbling of the earth. "Between tomorrow and the year 2000," as suggested by Haroun Tazieff...

Map: Seismic Zones in France.



Four Earthquake Zones in France

In Zone 0, no anti-earthquake rule is compulsory: no earthquakes have ever occurred there. The seismicity of Zone 1 is very low but not negligible on the MSK scale: the intensity limit is 8, which corresponds to the destruction of some dwellings. The seismicity of Zone 2 is low and does not go beyond 9, which does however correspond to generalized damage to structures. There the time interval between two earthquakes registering an intensity of 8 is approximately 250 years. In Zone 3, the seismicity is average, reaching an intensity above or equal to 9. There the time interval between two earthquakes registering an intensity of 8 is less than 200 years.

While the majority of the power plants and dams are located in these zones, it has never been possible to observe the effects of earthquakes with an intensity of 7 to 9. The real danger could come from certain chemical enterprises, which are very numerous in these zones and whose toxic products are sometimes poorly contained.

These are establishments subject to the regulations of the "Seveso" directive.

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SWEDEN

BRIEFS

ZIRCONIUM PIPE EXPORT APPROVED--AB Sandvik Steel has obtained government permission to send 18,000 kilograms of so-called zirconium pipes for nuclear power plants in France and West Germany. Export of zirconium pipes is considered export of sensitive nuclear equipment, and can only be made to countries which have pledged to use the pipes only in civilian nuclear power industry. Therefore each request for exporting must be handled separately. So far Sandvik has exported zirconium pipes to Japan in various quantities, to other European countries and to the United States. However, this export activity is surrounded by much hush-hush, due to the fact that there are only a few companies in the world which make zirconium pipes. These are in very much demand by the nuclear power industry, since on the one hand they are made of special alloy making them immune to rust, and on the other hand because they can be used in all types of light-water reactors. [Text] [Stockholm DAGENS NYHETER in Swedish 6 Sep 86 p 14] /12232

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